UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT
SUBMITTAL REPORT

Created on
17-DEC-2020
07:51:22

Submittal Overview

Operator:	BP Exploration & Production Inc. (02481)
Business Process:	Pipeline Permits and Reports
Submittal Type:	Plan of Corrective Action
Project Name:	Nakika
Submittal Coordinator:	Shrestha, Bimal
Submittal Status:	Approved
Submittal ID:	187447650
Status Date:	17-DEC-2020
Submittal Description:	Na Kika Galapagos Loop Revised Corrective Action
Remarks:	bp was able to locate the point of ingress/egress in the same segment using the corrective action plan (CA83P) approved on November 2, 2020 as given in detail in Section 3 of the attached plan. bp plans to move forward to execute the corrective action in Section 4 of the revised plan and hereby submits the enclosed Corrective Action Plan to your office for review and approval. bp would be ready to execute the revised Corrective Action Plan as early as December 11, 2020.

Final Action

Decision Maker:	Shrestha, Bimal Pipeline Engineer GOMR Pipeline Section		
Submitted Date	01-DEC-2020		
Review Decision:	Approved	Decision Date	17-DEC-2020

The Plan of Corrective Action, submitted on 01-DEC-2020, has been Approved on 17-DEC-2020

Decision Maker's comments: In the event the pipeline needs to be relocated, an application to modify pipeline needs to be submitted.

Please be reminded that, in accordance with 30 CFR 250.1008(g), the operator shall submit a written notification to the BSEE Pipeline Section within 30 days from the date the corrective action is completed. The notification should include the date of the completion of the project and an indication that the remedial action was performed in accordance with the proposed plan.

Mitigation

Metadata

Segment Number(s):	16283
ROW Number:	
Regulatory Authority:	DOI
Departing Area-Block:	MC-519
Terminating Area/Block:	MC-519
Departing Facility/Well/PPL:	SA PLEM #1
Terminating Facility/Well/PPL:	SA PLEMP #2

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ROW Permitee Name:
ROW Permitee Code:

Submittal Statuses

Status	Creator	Created	Modifier	Last Modified
Approved	shresthb@mms.gov	17-DEC-2020 07:51:08		

In the event the pipeline needs to be relocated, an application to modify pipeline needs to be submitted.

Remark

Please be reminded that, in accordance with 30 CFR 250.1008(g), the operator shall submit a written notification to the BSEE Pipeline Section within 30 days from the date the corrective action is completed. The notification should include the date of the completion of the project and an indication that the remedial action was performed in accordance with the proposed plan.

Status	Creator	Created	Modifier	Last Modified
In Review	wrightt@mms.gov	07-DEC-2020 09:21:04	shresthb@mms.gov	17-DEC-2020 07:51:08

Remark

Status	Creator	Created	Modifier	Last Modified
Submitted	o-clelandb	01-DEC-2020 17:55:57	wrightt@mms.gov	07-DEC-2020 09:21:04

Remark

Status	Creator	Created	Modifier	Last Modified
Draft	o-clelandb	01-DEC-2020 17:51:02	o-clelandb	01-DEC-2020 17:55:57

Remark

Variances

NO VARIANCES

Contacts

MS. Cleland, Betsy X	Phone:	(281)773-9088 - Cell	Email:	betsy.cleland@bp.com
Contact Type:	Regulatory Contact 1			
Address:				

Verbal Authorization

NO VERBAL AUTHORIZATIONS

Payments

NO PAYMENTS

Checklist

NO CHECKLIST

Requests for Information

NO RFIS

Associated Submittals

NO Associated Submittals

Betsy Cleland
Lead Regulations & Permitting Advisor

BP Exploration & Production Inc.
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Houston, Texas 77079
Cell: 281-773-9088
betsy.cleland@bp.com

December 1, 2020

Ms. Angie Gobert
Pipeline Section Chief
Bureau of Safety and Environmental Enforcement
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Reference: 2020 Plan of Corrective Action - Revised
Segment No. 16283

Ms. Gobert:

BP Exploration & Production Inc. (bp) requests approval for a revised plan of corrective action to diagnose and locate a point of ingress/egress in Segment 16283 of the Na Kika field. Segment 16283 is currently out of service because a point of ingress/egress was observed by ROV inspection on 07 July 2020, at which point the line was shut-in, displaced with dead oil and depressurized. The point of ingress/egress was observed to be near the SLDV1-3874 valve at the Santa Cruz PLEM #2.

bp was able to locate the point of ingress/egress in the same segment using the corrective action plan (CA83P) approved on November 2, 2020 as given in detail in Section 3 of the attached plan.

bp plans to move forward to execute the corrective action in Section 4 of the revised plan and hereby submits the enclosed Corrective Action Plan to your office for review and approval.

bp would be ready to execute the revised Corrective Action Plan as early as December 11, 2020.

If you have any questions, please contact the undersigned at 281-773-9088 or Betsy.Cleland@bp.com

Sincerely,

Betsy Cleland
Lead Regulations and Permitting Advisor

Attachments:
Proposed Revised Near-Term Execution Plan for Galapagos LSPS Response

Revision 3 of Galapagos LSPS Response Corrective Action Plan

1. Galapagos Layout

The Galapagos loop subsea production system (LSPS) is in the Mississippi Canyon Area (MC) Blocks 561 and 519, at water depths between 6,300ft and 6,550ft. The LSPS ties back to the host facility at Na Kika. Figure 1 illustrates a schematic of the field.

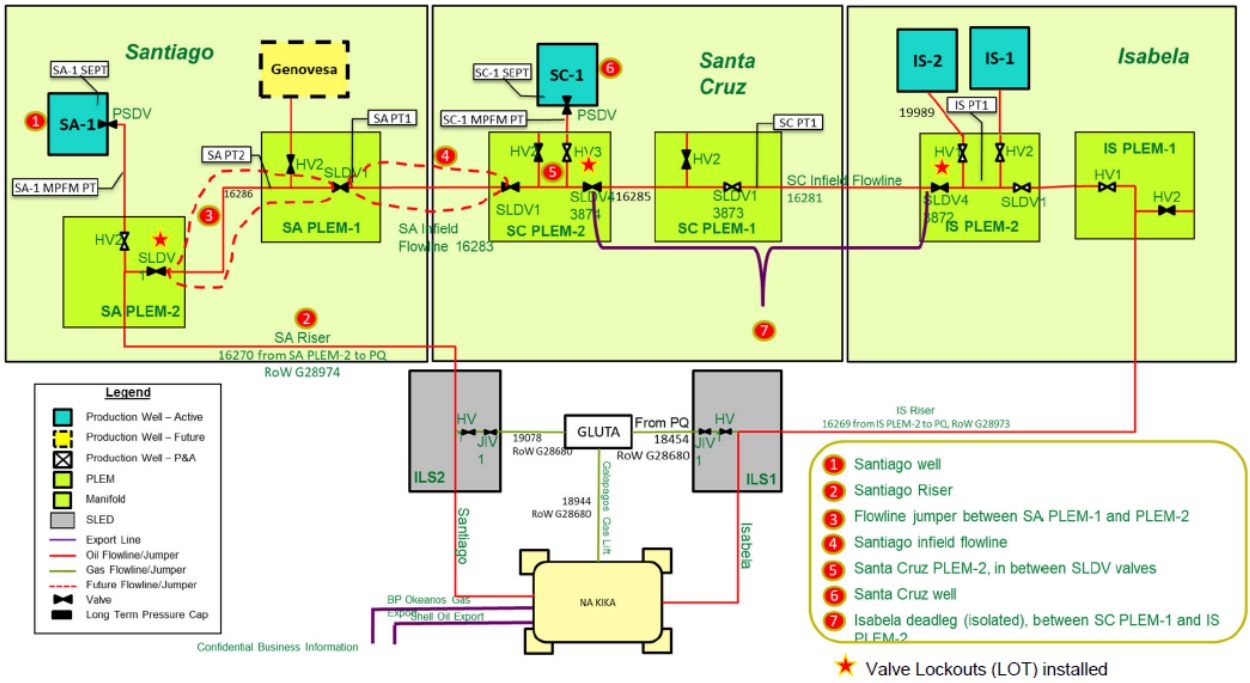

Figure 1: Field Schematic

2. History

The following information has led to implementation of a near-term Corrective Action Plan.

March 2020 – Santiago (SA) side of Galapagos Loop was shut in with dead oil and stabilized below hydrostatic pressure.

April 2020 - Ingress was identified through trending and remotely operated vehicle (ROV) visual monitoring during an offshore campaign. ROV inspections did not identify any signs of an ingress point.

May 2020 – Diagnostics completed with ROV onsite during which Santa Cruz (SC) PLEM2 and SA PLEM1 were exposed to above hydrostatic pressure (~3,300psi for 6hrs). Trending and ROV visual monitoring did not identify any fluid egress. No issues identified with SA flowline jumper, SA riser, SA flowline and SA PLEM2. However, potential ingress location deemed to be either SC PLEM 2 or SA PLEM 1.

June 2020 – Further diagnostics completed but BP was unable to pinpoint ingress source.

July 2020 – Performed static 4,000psi pressure hold for ~23hrs. Trending and ROV visual monitoring did not identify any egress. Initiated dead oil circulation and after ~9.5hrs at 4,000psi and 120deg F, pea-size bubbles were seen at SC PLEM-2 SLDV1 valve (one (1) bubble every 30-45s). No sign of egress was observed at SA PLEM1. Circulation was stopped, system was bled down below hydrostatic and egress

rate decreased to one (1) bubble per hour. ROV vessel returned for another inspection one (1) week later and no bubbles were observed.

13 - 14 August 2020 – Lockout devices were installed on some SLDVs to maintain current isolations.

14 August 2020 – ROV inspection confirmed no further leak from SC PLEM2 SLDV1.

3. Summary of Previously Approved Corrective Action Plans

3 - 5 September 2020 – Insulation was removed (Figure 2) at grease port locations and other areas where it had disbonded on the SLDV1 valve located at the SC PLEM2. While the insulation removal campaign was unable to identify the leak source, results indicated that additional insulation removal would increase the probability of determining the leak source.

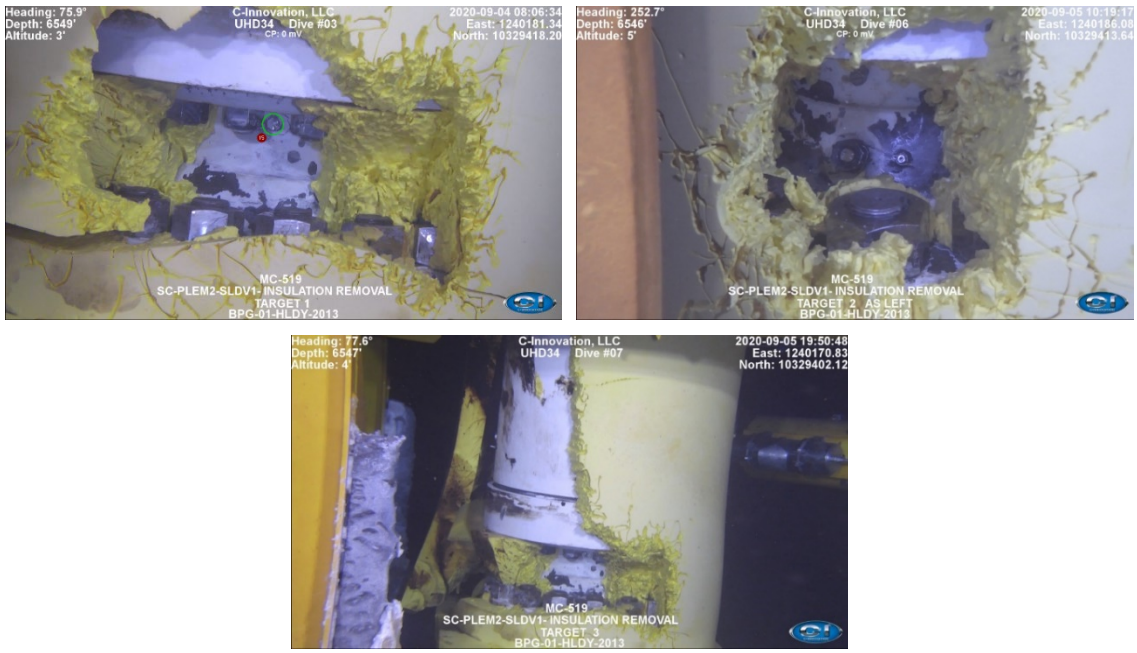

Figure 2: Insulation Removal Results for Grease Port and Disbonded Insulation (Targets 1-3)

25 - 29 September 2020 – Following approval of previous Corrective Action Plan on 14 September 2020, additional insulation was removed (Figures 3 – 5) as attempts to pressurize the SC PLEM2 failed due to lack of communication to the bore.

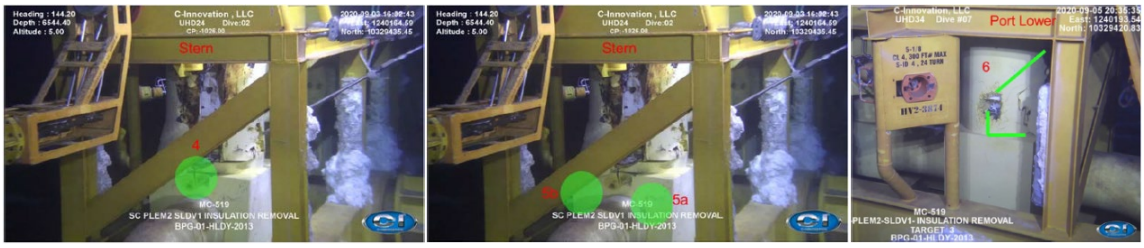

Figure 3: Additional Insulation Removal Targets (Targets 4-6)

While additional insulation removal was unable to identify the leak source, visibility at the areas of interest (targets) had been improved and the likelihood of finding the leak source during pressurization has increased.

Figure 4: Insulation Removal Results for Targets 4, 5a and 5b

Figure 5: Insulation Removal Results for Targets 6

13 - 20 October 2020: During this campaign, communication to the valve bore and subsequent pressurization was achieved via ROV. Presence of ingress/egress was not witnessed by ROVs during 44 hours of pressure testing as the SLDV1 valve at SC PLEM2 was cycled open to closed position for one (1) hour during the below hold times.

A summary of the pressures and hold times are provided below:

- First Test: Pressurized to roughly 5,000 psia at a hold time of 8 hours.
- Second Test: Pressurized to roughly 6,000 psia at a hold time of 24 hrs.
- Third Test: Pressurized to roughly 8,500 psia and held for 12 hrs.

10 – 16 November 2020: When dead oil circulation was initiated, ROV observed dead oil or other fluid egress from the SLDV1 valve located at SC PLEM 2. The egress source origination point was identified as the gasket seal located between the valve bonnet and valve body; see Figure 6. ROV was utilized to collect the egressed volume located under the containment dome and the collected sample bottle returns were sent to Core Labs for testing. No additional egress points were identified during the circulation test.

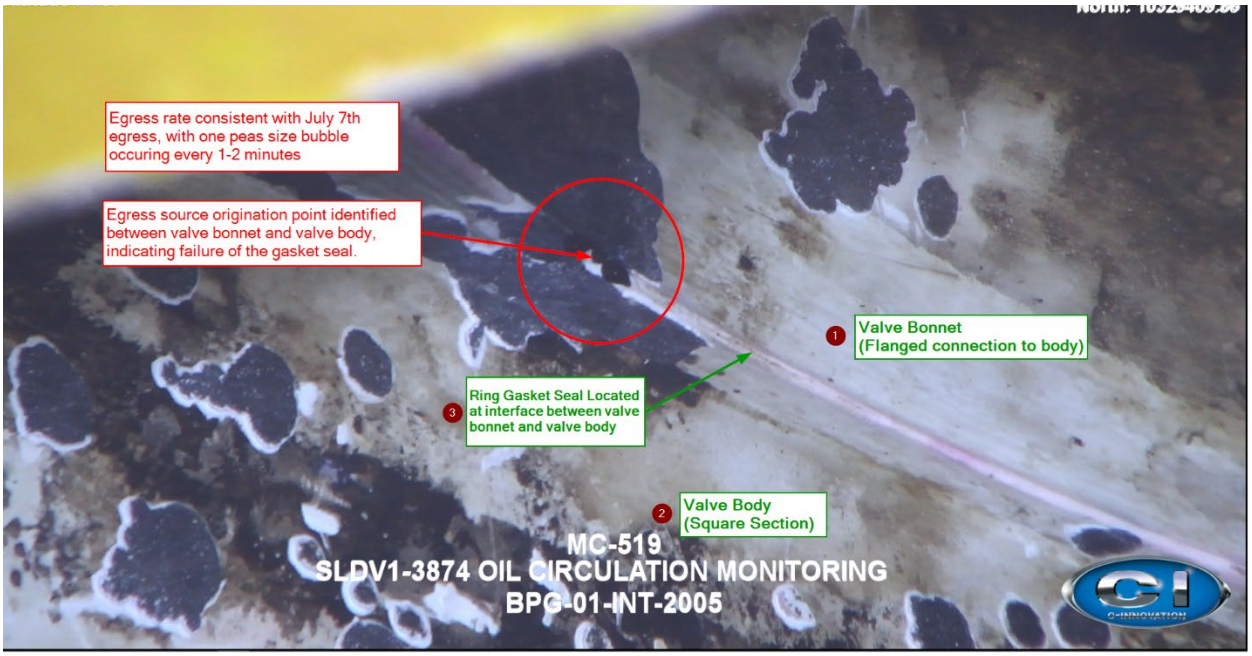

Figure 6: Egress Location

Egress Details:

Egress was witnessed at 14:40 on 15 November following roughly 36 hours of circulation. The egress rate was estimated to be a single pea size bubble (1 cm^3) releasing at an interval of 1 to 2 minutes. The last witnessed release was at 04:23 on 16 November, with the pressure in the SC2 PLEM returning to below hydrostatic conditions at roughly 5:15. The volume of the release is therefore estimated to be between 411 cm^3 (.10 gal) and 875 cm^3 (.23 gallons). No additional bubbles were observed after the pressure was returned to below hydrostatic conditions.

3.1 Current Status

The current status of the impacted segment as of 18 November 2020 is as follows:

- SC-1 and SA-1 wells remain shut in and safed-out.
- System pressures are below hydrostatic pressures:
  - SC PLEM-2 at 2,085 psi.
  - SA flowline at 2,084 psi
  - SA flowline jumper at 2,082 psi
- ROV installable mechanical valve lock closed devices have been installed on two (2) PLEM valves (SLDV1 3873 and SLDV4 3872) for LSPS loop isolation from the area of ingress/egress.

4. Revised Corrective Action Plan

Based on findings of the 10 – 16 November 2020 campaign, BP is proposing the following Corrective Action Plan to mitigate the SC2 PLEM egress from the SLDV1 valve gasket seal located at the interface of the valve bonnet and body.

1. Install containment dome above SC PLEM2 SLDV1.
2. Re-torque the actuator flange bolts on SC PLEM 2 SLDV1 per Original Equipment Manufacturer (OEM) recommendation.
3. Perform an ingress test to confirm integrity (no increase in pressure in the SA flowline).
4. Perform a leak test to 1.1 times maximum allowable operating pressure (MAOP) with dead oil (currently in the flowline) to confirm integrity of the system with no unexplained pressure behaviors and no ROV-observed egress.
5. Perform hot oil circulation and achieve a temperature of 120F or higher at SC PLEM2. Confirm no temperature related egress.

4.1 Installation of Containment Dome

A containment dome (Figure 7) will be installed on top of SC PLEM2 SLDV1 to collect any potential egress. The dome will be ROV installed and sample bottles will be used to collect any trapped bubbles.

The containment dome will be in place throughout the diagnostics and during all scenarios where pressure in SC PLEM2 will be above ambient hydrostatic pressure.

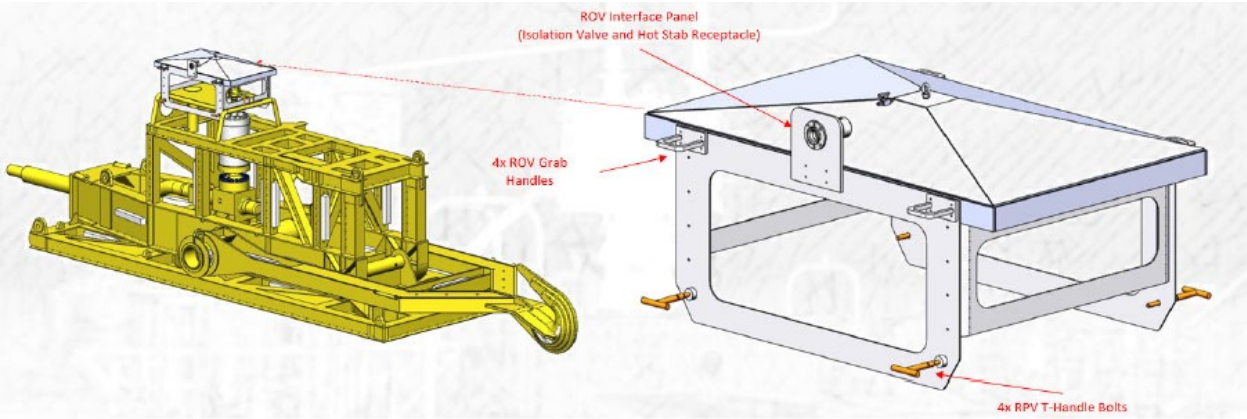

Figure 7: Containment Dome

4.2 Flange Bolt Tightening

Utilize an ROV intervention to re-apply the SLDV1 OEM recommended torque values to the actuator flange bolts to restore the required gasket seal pre-load; see Figure 8 below.

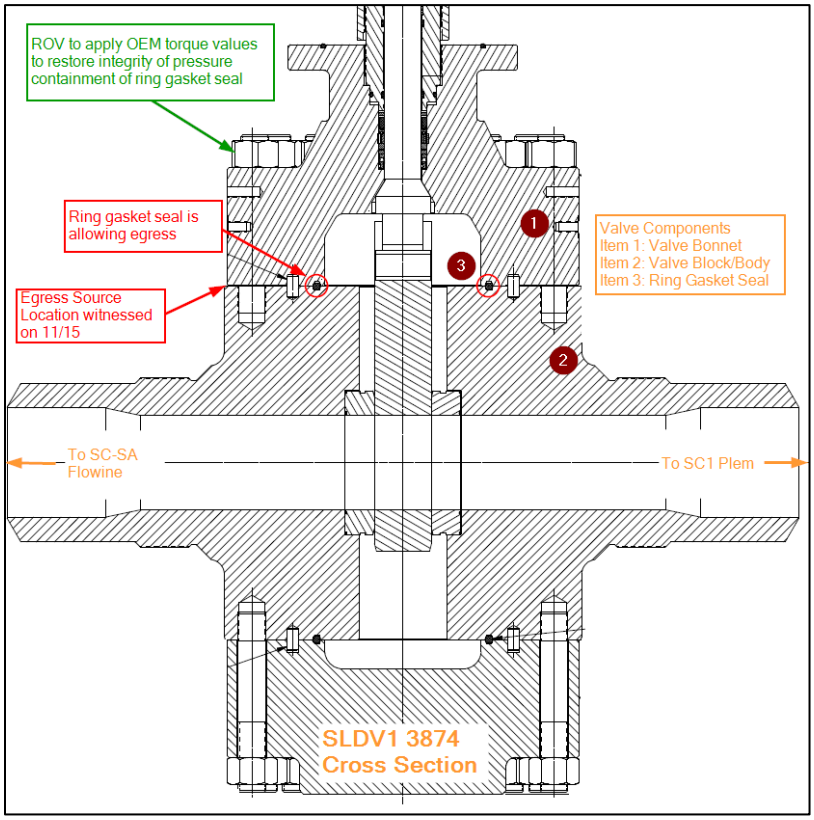

Figure 8: SLDV1 In-situ gasket repair option

4.3 Ingress and Egress Leak Tests

Ingress test: After the flange bolts are tightened, pressure will be lowered in SA flowline to a value lower than hydrostatic pressure. The flowline will be isolated and held at this pressure to confirm ingress integrity.

Egress test: Upon a successful completion of ingress test, the system will be leak tested to 1.1 times MAOP with dead oil (currently in the flowline) to confirm integrity of the system with no unexplained pressure behaviors and no ROV-observed egress. The containment dome will be in place throughout the duration.

4.4 Dead Oil Circulation

Dead oil circulation will be performed upon successful completion of ingress and leak tests. Dead oil will be circulated for a minimum of 48hrs at a minimum temperature of 120F to confirm no temperature related egress occurs. The steps for dead oil circulation are detailed below:

- Remove all remaining field lock out devices for an open flow path.

- Once notified by the vessel, platform to begin flowing dead oil down the SA riser. Note: Dead oil circulation pressure will not exceed loop MAOP.
- If egress is identified at a location other than the bonnet area or is not identifiable, BP will stop the circulation and ensure the pressure in the flowline segment is below hydrostatic.

5. Execution of Corrective Action Plan

BP plans to execute the above-mentioned revised near-term Corrective Action Plan in December 2020 upon BSEE's approval.

In case the leak point cannot be mitigated during the campaign, or the leak point is identified somewhere other than the bonnet area, BP is working on long-term Corrective Action Plans. Those plans would be finalized based on the findings from the near-term remediation campaign, and may include:

- Recover the PLEM from seabed and replace/repair.
- Reroute the pipeline to a new PLEM structure.

Any new Corrective Action Plan that is prepared will be submitted to BSEE for approval.